

Shrinking Shorelines and Developing Deltas

The coast of Louisiana is changing quickly. Most of the shoreline is losing land, but in some places where water from the Mississippi River reaches the Gulf of Mexico, new land is forming.

Gaining Ground

The Mississippi River, famous as a major trade route for North America, carries more than just ships, canoes, and barges. It carries **sediment**.

Sediment is scraped off the river banks and bottom as the water flows over it. The rocks, mud, and sand travel with the current and settle downstream. Sediment that makes it to the end of the Mississippi River gets deposited where the river enters the Gulf of Mexico, forming a delta.

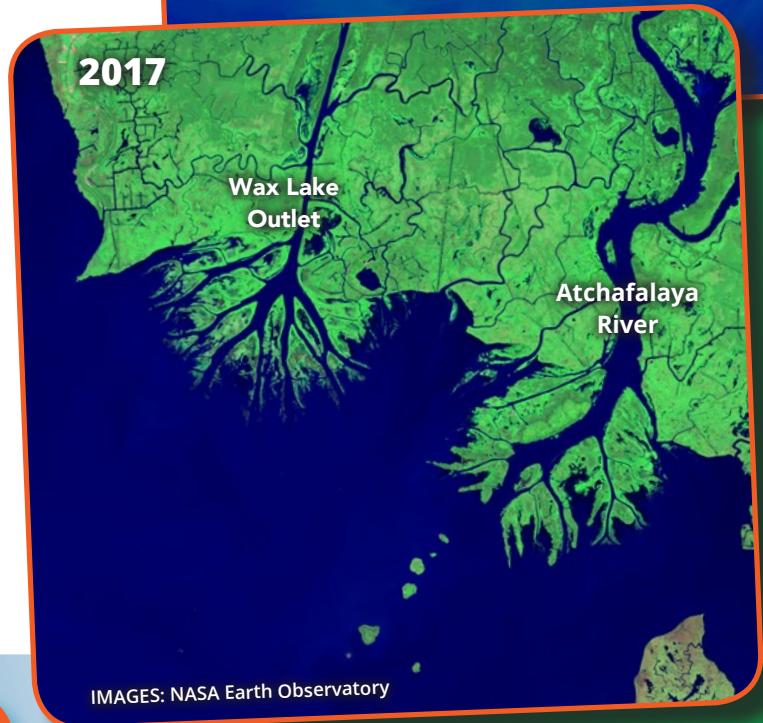
First Flood, then Dredge

When the Mississippi River floods, the river gets wider, deeper, and moves faster. When it rises out of its banks, it picks up more sediment from the land. The sediment gets deposited downstream, sometimes blocking shipping **channels**. To clear the channels, machines are used to dredge or scrape the mud and rock from the river bottom. The wider, cleared channels allow more water to transport rock and mud downstream where it gets deposited in the delta. Both flooding and dredging can increase the sediment in the river and make deltas grow.

Vocabulary:

sediment – Material like stones, sand, or mud that is moved by water.

channel – A path through which water flows; often the deeper part of a waterway.



Two deltas connected to the Mississippi River are not forming at the same rate. The Atchafalaya Delta is growing faster than the Wax Lake Delta. The Atchafalaya River is regularly dredged to make it wider for ships. The Wax Lake Outlet is not dredged, so the delta grows more naturally and slowly. The Landsat satellite has been watching both deltas change since 1972.

Losing Land

Despite a few growing **deltas**, most of Louisiana's shoreline is shrinking.

Southern Louisiana is famous for swamps and bayous. But these are challenging places to live because they are regularly threatened by storms and floods. To protect towns from flooding, engineers have built **levees** along the Mississippi River to keep the

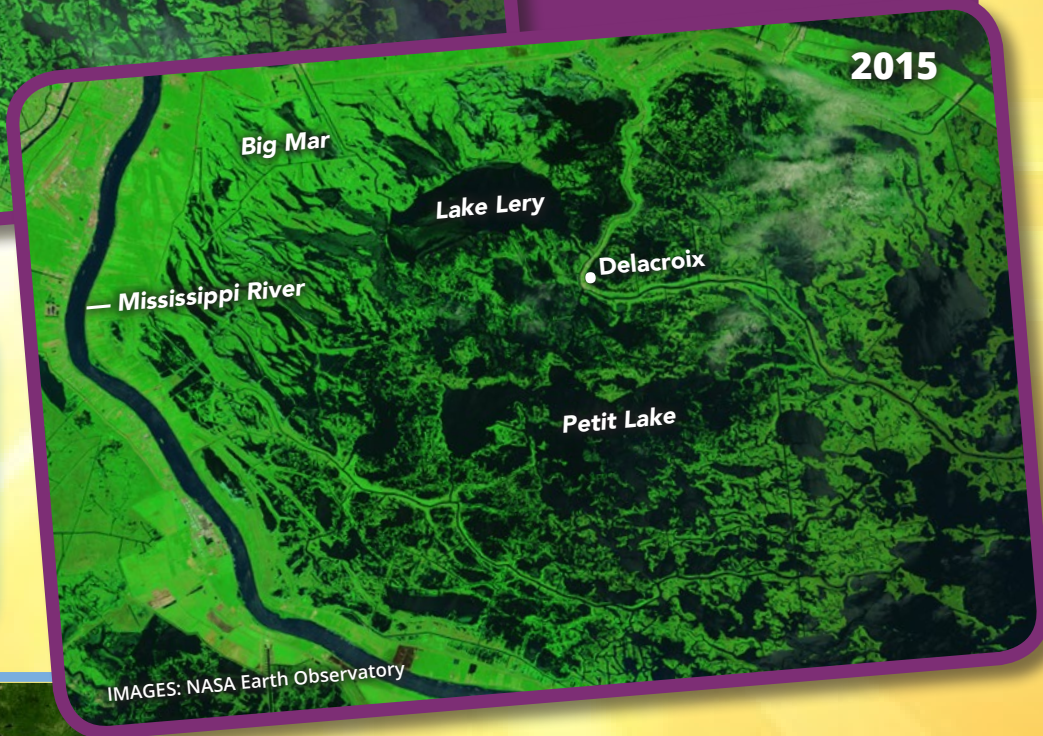
river within its banks. However, the levees also prevent sediment from being deposited in the wetlands next to the Mississippi. Without that sediment, the wetlands are no longer being naturally built up. At the same time, the weight of the levees is pushing down on the wet soil, squishing it and causing the land to sink.



Louisiana,
United States



Much of Louisiana's coastline is like the expansive wetland to the southeast of New Orleans, where open water is replacing land. In 2005, Hurricane Katrina battered the already disappearing wetlands, wiping out or submerging large areas. The Landsat satellite recorded the changes.



Vocabulary:



delta – A triangle-shaped landform made from sediment that is deposited where a river enters a bay, lake, or sea.

levee – A ridge built along a river that prevents flooding.



The Mississippi River drains water from almost 40 percent of the continental United States and picks up sediment along the way. If a raindrop or snowflake falls east of the Rockies and west of the Appalachians, it will probably end up in the Mississippi River — along with stones or mud that started as far away as Montana or Pennsylvania.

Data Detective

Case of the Disappearing Delta

Think Like a Scientist

In the 1930s, levees were built to prevent flooding. But without regular floods, the sediment supply to the marshes has stopped. Without the added sediment, land has disappeared. Sometimes the land is slowly washed away by waves, and at other times hurricanes wash away much more. NASA scientists use images like these to determine how much land has been replaced by water. Can you?

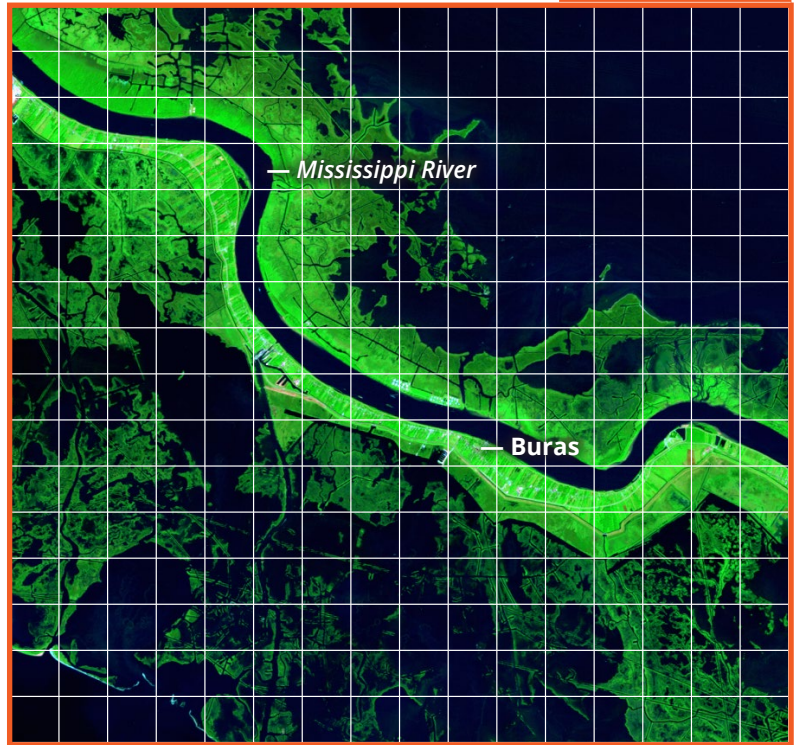
Estimate the percentage of the image that has changed from land to water between 1987 and 2017.

1. How many squares are on each grid? _____
2. How many squares are completely covered by water for each image?
1987: _____, 2017: _____
3. What percentage of each image is completely covered by water?
1987: _____, 2017: _____
4. About what percentage of the image changed to water from land between 1987 and 2017? _____
5. If this trend continues, what do you think the coastline will look like in 2047?

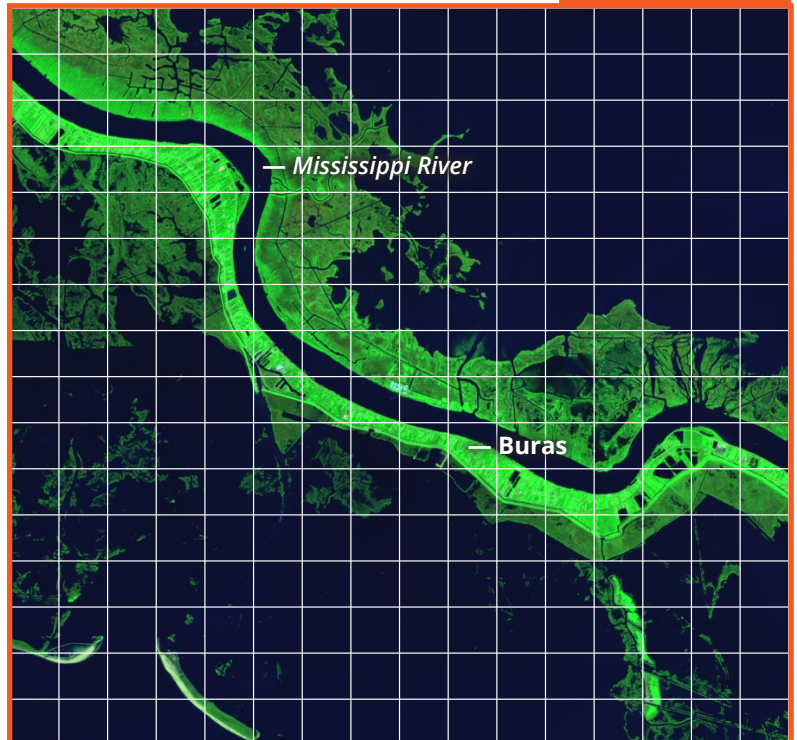


NASA's Terra satellite shows the brown sediment reaching the Gulf of Mexico in late February 2018 after a flood on the Ohio River, which flows into the Mississippi River.

October 1987



October 2017



KEY: Green = land
Black or dark blue = water

IMAGES: Mike Taylor

See page 2 for answers.